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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/009,910	12/12/2001	Makoto Iida	81839.0107	7347

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EXAMINER

SONG, MATTHEW J

ART UNIT PAPER NUMBER

1765

DATE MAILED: 10/08/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Advisory Action

Application No.

10/009,910

Applicant(s)

IIDA ET AL.

Examiner

Matthew J Song

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--The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

THE REPLY FILED 22 September 2004 FAILS TO PLACE THIS APPLICATION IN CONDITION FOR ALLOWANCE. Therefore, further action by the applicant is required to avoid abandonment of this application. A proper reply to a final rejection under 37 CFR 1.113 may only be either: (1) a timely filed amendment which places the application in condition for allowance; (2) a timely filed Notice of Appeal (with appeal fee); or (3) a timely filed Request for Continued Examination (RCE) in compliance with 37 CFR 1.114.

PERIOD FOR REPLY [check either a) or b)]

- a) ☒ The period for reply expires 3 months from the mailing date of the final rejection.
- b) ☐ The period for reply expires on: (1) the mailing date of this Advisory Action, or (2) the date set forth in the final rejection, whichever is later. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of the final rejection. ONLY CHECK THIS BOX WHEN THE FIRST REPLY WAS FILED WITHIN TWO MONTHS OF THE FINAL REJECTION. See MPEP 706.07(f).

Extensions of time may be obtained under 37 CFR 1.136(a). The date on which the petition under 37 CFR 1.136(a) and the appropriate extension fee have been filed is the date for purposes of determining the period of extension and the corresponding amount of the fee. The appropriate extension fee under 37 CFR 1.17(a) is calculated from: (1) the expiration date of the shortened statutory period for reply originally set in the final Office action; or (2) as set forth in (b) above, if checked. Any reply received by the Office later than three months after the mailing date of the final rejection, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

1. ☐ A Notice of Appeal was filed on _____. Appellant's Brief must be filed within the period set forth in 37 CFR 1.192(a), or any extension thereof (37 CFR 1.191(d)), to avoid dismissal of the appeal.
2. ☒ The proposed amendment(s) will not be entered because:
- (a) ☐ they raise new issues that would require further consideration and/or search (see NOTE below);
- (b) ☐ they raise the issue of new matter (see Note below);
- (c) ☒ they are not deemed to place the application in better form for appeal by materially reducing or simplifying the issues for appeal; and/or
- (d) ☐ they present additional claims without canceling a corresponding number of finally rejected claims.

NOTE: _____

3. ☐ Applicant's reply has overcome the following rejection(s): _____.
4. ☐ Newly proposed or amended claim(s) _____ would be allowable if submitted in a separate, timely filed amendment canceling the non-allowable claim(s).
5. ☒ The a) ☐ affidavit, b) ☐ exhibit, or c) ☒ request for reconsideration has been considered but does NOT place the application in condition for allowance because: see continuation sheet.
6. ☐ The affidavit or exhibit will NOT be considered because it is not directed SOLELY to issues which were newly raised by the Examiner in the final rejection.
7. ☒ For purposes of Appeal, the proposed amendment(s) a) ☒ will not be entered or b) ☐ will be entered and an explanation of how the new or amended claims would be rejected is provided below or appended.

The status of the claim(s) is (or will be) as follows:

Claim(s) allowed: _____.

Claim(s) objected to: _____.

Claim(s) rejected: 1-10.

Claim(s) withdrawn from consideration: _____.

8. ☐ The drawing correction filed on _____ is a) ☐ approved or b) ☐ disapproved by the Examiner.
9. ☐ Note the attached Information Disclosure Statement(s) (PTO-1449) Paper No(s). _____.
10. ☐ Other: _____.

NADINE G. NORTON
SUPERVISORY PATENT EXAMINER



Response to Arguments

Continuation of Item 5:

Applicant's arguments filed 9/22/2004 have been fully considered but they are not persuasive.

Applicants' argument that the 112 first paragraph rejection of claim 9 should be withdrawn because the specification provides support for the density of oxygen precipitation nuclei is noted but is not found persuasive. Applicants' allege that the oxygen precipitation nuclei is 1×10^9 number/cm³ formed by the heating treatment because the density of BMD that oxygen precipitation grow is 1×10^9 number/cm³. There is still no explicit or implicit teaching of the oxygen precipitation nuclei density is 1×10^9 number/cm³. Applicants' argument is based on there being 1×10^9 number/cm³ of BMD, which is the density of internal micro defects due to oxide precipitates and the density of BMD is the density of oxide precipitates that oxygen precipitates nuclei grow. This reasoning is flawed because applicants are assuming that each BMD formed is formed from each oxide precipitate, which is not supported. Each oxide precipitate nuclei could form more than one BMD, so the density of oxygen precipitation nuclei cannot be determined from the density of BMD, which is formed from them. Furthermore, BMD is defined as the bulk micro defects due to oxide precipitates, not the oxide precipitate nuclei. There is no defined relationship between BMD density and oxide precipitate nuclei, as suggested by applicant in the instant specification. Therefore, the rejection of claim 9 is maintained.

Applicants' argument that the rejections over Iida, Fujikawa, Tamatsuta, Hourai and Asayama should be withdrawn is noted but is not found persuasive. Applicants' allege that by doping the crystal with carbon, the pulling rate to obtain the N-region is improved faster

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irrespective of no change of temperature gradient and the speeding up for the N-region cannot be easily derived from Iida et al, Fujikawa, Hourai and Asayama et al. Regarding, Iida et al, applicants' suggest that there would be no need for experimentally changing the pulling rate because there is a constant temperature gradient and a person of ordinary skill in the art would simply perform Iida et al's optimally determined pulling rate to a silicon ingot doped with carbon, as taught by Fujikawa et al. However, applicants argument is flawed because applicants are assuming that doping with carbon does not substantially affect the ability to form an N-region (pg 7-8), so a person of ordinary skill in the art would perform the process taught by Iida et al using the parameters, which were determined for an ingot without carbon. Doping with carbon does affect the ability to produce an N-region over the entire wafer, as evidenced by applicants' disclosure, note page 15 of the specification. Applicants teach that the OSF ring disappears at pulling rates greater than 0.65 mm/min and without doping with carbon disappear at 0.54 mm/min, which is similar to the result taught by Iida et al (col 15, ln 45-55). Clearly, based on applicants disclosure, if a person of ordinary skill in the art were to perform Iida et al's process using the parameters taught by Iida et al to form a carbon doped ingot at the normal pulling speed for forming an N-region over an entire plane; an ingot with an N-region over an entire plane of the crystal would **not** be formed. Therefore, it would have been obvious to a person of ordinary skill in the art at the time of the invention to modify the combination of Iida et al and Fujikawa by optimizing the pulling rate to determine the rate required to form an N-region over an entire plane using the method taught by Iida et al in Example 1.

In response to applicant's argument that the dopant dependence of the V/G value (pg 10), the fact that applicant has recognized another advantage which would flow naturally from

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following the suggestion of the prior art cannot be the basis for patentability when the differences would otherwise be obvious. See *Ex parte Obiaya*, 227 USPQ 58, 60 (Bd. Pat. App. & Inter. 1985). Performing the operations taught by Iida et al, Hourai et al or the other cited references to form a N-region over an entire plane of the wafer would not occur for a carbon doped ingot, as taught by applicants. Therefore, it is necessary to determine the pulling speed required to determine the value need to produce an N-region over an entire plane of a crystal doped with carbon by conducting routine experimentation of a result effective variable. The fact is the carbon doped ingot does not form an N-region using the parameters taught by the prior art. The prior is not restricted to the values disclosed and the prior art teaches a method of determining the optimal pulling speed required. Therefore, the dopant dependence would have naturally flowed from the prior art teachings.